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REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978

COMPLETE SPECIFICATION

(Section 30(1) - Regulation 28)

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54 Title of invention

MOBILE MINING MACHINE.

WE CLAIM:

1. A mobile mining machine for cutting a tunnel in rock, comprising:

a wheel-like cutterhead assembly means for cutting rock, said cutterhead assembly means having a substantially horizontal axis of rotation and having multiple peripherally mounted roller cutter units;

rotation means for rotating said cutterhead assembly means about its horizontal axis;

pitch boom assembly means supporting said cutterhead assembly means, said pitch boom assembly means causing vertical movement of said cutterhead assembly means;

swing boom assembly means supporting said pitch boom assembly means, said swing boom assembly means causing horizontal movement of said cutterhead assembly means and said pitch boom assembly means;

frame means having front and rear portions supporting said swing boom assembly means;

thrust means mounted on said frame means between the front and rear portions thereof for thrusting forward as a unit the front portion of said frame means, said swing boom assembly means, said pitch boom assembly means and said cutterhead assembly means;

holding means for holding stationary the rear portion of said frame means when said thrust means is thrusting forward, said holding means being adapted to anchor said rear portion of said frame means relative to the tunnel; and

transport means for tramming said mobile mining machine.

2. The mobile mining machine of claim 1, wherein said front frame portion and said rear frame portion are interconnected and adapted to reciprocate axially with respect to each other.

3. The mobile mining machine of claim 2, wherein said front frame portion and said rear frame portion are interconnected by said thrust means, and said front frame portion and said rear frame portion are axially rotatable with respect to each other.

4. The mobile mining machine of claim 2, wherein said holding means comprises:

fixed front support means having front support pad means adapted to anchor against the tunnel floor and

front gripper cylinder means adapted to anchor against the tunnel wall, said fixed front support means being slidably mounted on said front frame portion on an axis longitudinal of said mobile mining machine for relative movement of said fixed front support means and said front frame portion with respect to each other;

fixed rear support means having rear support pad means adapted to anchor against the tunnel floor and rear gripper cylinder means adapted to anchor against the tunnel wall, said fixed rear support means being fixedly mounted on said rear frame portion; and

attachment link means connecting said fixed front support means and said fixed rear support means.

5. The mobile mining machine of claim 4, wherein said transport means comprises:

front crawler means movable with respect to said front frame portion by front lift cylinder means; and

rear crawler means movable with respect to said rear frame portion by rear lift cylinder means whereby retraction of said front lift cylinder means and said rear lift cylinder means configures said mobile mining machine in a gripping configuration in which said front support pad means and said rear support pad means are anchored against the tunnel floor, and extension of

said front lift cylinder means and said rear lift cylinder means configures said mobile mining machine in a re-gripping configuration in which said front crawler means and said rear crawler means contact the tunnel floor and support the machine, and whereby said front frame portion moves forward relative to said fixed front support means, said fixed rear support means, and said rear frame portion due to forward thrusting of said thrust means when said mobile mining machine is in the gripping configuration, and said fixed front support means, said fixed rear support means and said rear frame portion move forward relative to said front frame portion due to retraction from forward thrusting by said thrust means when said mobile mining machine is in the re-gripping configuration.

6. The mobile mining machine of claim 5, wherein further extension of said front lift cylinder means and said rear lift cylinder means configures said mobile mining machine in a tramming configuration in which said front support pad means and rear support pad means are raised from the tunnel floor.

7. The mobile mining machine of claim 1, wherein said pitch boom assembly means includes four pitch boom cylinders

attached to said pitch boom assembly means and to said swing boom assembly means.

8. The mobile mining machine of claim 1, wherein said swing boom assembly means includes two swing boom cylinders, attached to said swing boom assembly means and to said frame means.

9. The mobile mining machine of claim 1, further comprising:

a muck apron assembly including a substantially planar center section, a hopper on said center section having a conveyor feed opening adapted to communicate with muck conveyor means, substantially planar wing sections pivotally attached to ends of said center section, wing section swing cylinder means for pivotal movement of said wing sections between a substantially planar orientation with said center section and a substantially perpendicular orientation to said center section, and muck apron lift cylinder means for lifting and lowering said muck apron assembly relative to said mobile mining machine.

10. A mobile mining machine for cutting a tunnel in rock comprising:

a wheel-like cutterhead assembly means for cutting rock, said cutterhead assembly means having a substantially horizontal axis of rotation and having multiple peripherally mounted roller cutter units;

rotation means for rotating said cutterhead assembly means about its horizontal axis;

pitch boom assembly means supporting said cutterhead assembly, said pitch boom assembly means causing movement of said cutterhead assembly in a vertical plane;

swing boom assembly means supporting said pitch boom assembly means, said swing boom asembly means causing movement of said cutterhead assembly and said pitch boom assembly means in a horizontal plane;

frame means supporting said swing boom assembly means, said frame means having a front frame portion and a rear frame portion, said front frame portion and said rear frame portion being interconnected and adapted to reciprocate axially and to rotate with respect to each other;

thrust means connecting said front frame portion and said rear frame portion, said thrust means for thrusting forward said front frame portion, said swing boom assembly means, said pitch boom assembly means and said cutterhead assembly means;

fixed front support means having a front support pad means adapted to anchor against the tunnel floor, and front gripper means adapted to anchor against the tunnel wall, said fixed front support means being slidably mounted on said front frame portion on an axis longitudinal of said mobile mining machine for movement of said fixed front support means and said front frame portion with respect to each other;

fixed rear support means having rear support pad means adapted to anchor against the tunnel floor and rear gripper cylinder means adapted to anchor against the tunnel wall, said fixed rear support means being fixedly mounted on said rear frame portion;

attachment link means connecting said fixed front support means and said fixed rear support means;

front crawler means movable with respect to said front frame portion by front lift cylinder means; and

rear crawler means movable with respect to said rear frame portion by rear lift cylinder means whereby retraction of said front lift cylinder means and said rear lift cylinder means configures said mobile mining machine in a gripping configuration in which said front support pad means and said rear support pad means are anchored against the tunnel floor and whereby extension of said lift cylinder means configures said mobile mining machine in a re-gripping configuration in which

said front crawler means and said rear crawler means contact the tunnel floor, such that said front frame portion is moved forward relative to said fixed front support means, said fixed rear support means and said rear frame portion due to forward thrusting of said thrust means when said mobile mining machine is in the gripping configuration, and said fixed front support means, said fixed rear support means and said rear frame portion move forward relative to said front frame portion due to retraction from forward thrusting, by said thrust means when said mobile mining machine is in the re-gripping configuration.

11. The mobile mining machine of claim 10, further comprising:

a muck apron assembly including a substantially planar center section, a hopper on said center section having a conveyor feed opening adapted to communicate with muck conveyor means, substantially planar wing sections pivotally attached to ends of said center section, wing section swing cylinder means for pivotal movement of said wing sections between a substantially planar orientation with said center section and a substantially perpendicular orientation to said center section, and apron lift cylinder means connecting said

muck apron assembly to the front of said mobile mining machine for lifting and lowering said muck apron assembly relative to said mobile mining machine.

12. A holding apparatus for a mobile mining machine having a front frame portion and a rear frame portion interconnected by thrust means and adapted to reciprocate axially with respect to each other, said holding apparatus comprising:

fixed front support means having front support pad means adapted to anchor against the tunnel floor and front gripper cylinder means adapted to anchor against the tunnel wall, said fixed front support means being mounted on the front frame portion to move on an axis longitudinal of said mobile mining machine for movement of said fixed front support means and the front frame portion with respect to each other;

fixed rear support means having rear support pad means adapted to anchor against the tunnel floor and rear gripper cylinder means adapted to anchor against the tunnel wall, said fixed rear support means fixedly mounted on the rear frame portion; and

attachment link means connecting said fixed front support means and said fixed rear support means.

13. The holding apparatus of claim 12, wherein the mobile mining machine includes front crawler means connected to the front frame portion and rear crawler means connected to the rear frame portion, said holding apparatus further comprising:

front lift cylinder means connecting the front crawler means and the front frame portion; and

rear lift cylinder means connecting the rear crawler means and the rear frame portion whereby actuation of said front lift cylinder means and said rear lift cylinder means configures the mobile mining machine in a gripping configuration in which said front support pad means and said rear support pad means are anchored against the tunnel floor and in a re-gripping configuration in which said front crawler means and said rear crawler means contact the tunnel floor without the support pad means being in load supporting contact with the tunnel floor, and whereby the front frame portion moves forward relative to said fixed front support means, said fixed rear support means, and the rear frame portion when the mobile mining machine is in the gripping configuration and the thrust means

thrusts forward, and said fixed front support means, said fixed rear support means and the rear frame portion move forward relative to the front frame portion when said mobile mining machine is in the re-gripping configuration and the thrust means retracts from forward thrusting.

14. The mobile mining machine of claim 13, wherein further extension of said front lift cylinder means and said rear lift cylinder means configures said mobile mining machine in a tramming configuration in which said front support pad means and said rear support pad means are raised from the tunnel floor.

15. The holding apparatus of claim 12, further comprising:

guide column means slidably mounted in a guide column channel in said front frame portion for sliding movement of said fixed front support means and the front frame portion with respect to each other; and

support trunnion means mounted in a cavity of the front frame portion and fixedly attached to said guide column means, said support trunnion being connected to said front gripper cylinder means and being sized smaller than the cavity for sliding movement of said

support trunnion means in the cavity upon sliding movement of said fixed front support means and the front frame portion with respect to each other.

16. A muck apron assembly for a mobile mining machine comprising:

a substantially planar center section;

a hopper on said center section having a conveyor feed opening adapted to communicate with muck conveyor means;

substantially planar wing sections pivotally attached to ends of said center section;

wing section swing cylinder means for pivotal movement of said wing sections between a substantially planar orientation with said center section and a substantially perpendicular orientation to said center section; and

muck apron lift cylinder means connecting for lift-up and lowering said muck apron asembly relative to the mobile mining machine.

17. A cutterhead positioning assembly for a mobile mining machine having a cutterhead and a frame, said cutterhead positioning assembly comprising:

pitch boom assembly means supporting said cutterhead and causing vertical movement of said cutterhead; and

swing boom assembly means supported by the frame, said swing boom assembly supporting said pitch boom assembly means and causing horizontal movement of said cutterhead and said pitch boom assembly means.

18. The cutterhead positioning assembly of claim 17, wherein said pitch boom assembly means includes four pitch boom cylinders attached to the pitch boom assembly means and to said swing boom assembly means.

19. The cutterhead positioning assembly of claim 17, wherein said swing boom assembly includes two swing boom cylinders attached to said swing boom assembly means and to the frame of the mobile mining machine.

20. A mobile mining machine for cutting a tunnel in rock substantially as herein described with reference to and as illustrated in any one of figures 1 to 11.

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attachment link means connecting said fixed front support means and said fixed rear support means.

13. The holding apparatus of claim 12, wherein the mobile mining machine includes front crawler means connected to the front frame portion and rear crawler means connected to the rear frame portion, said holding apparatus further comprising:

front lift cylinder means connecting the front crawler means and the front frame portion; and

rear lift cylinder means connecting the rear crawler means and the rear frame portion whereby actuation of said front lift cylinder means and said rear lift cylinder means configures the mobile mining machine in a gripping configuration in which said front support pad means and said rear support pad means are anchored against the tunnel floor and in a re-gripping configuration in which said front crawler means and said rear crawler means contact the tunnel floor without the support pad means being in load supporting contact with the tunnel floor, and whereby the front frame portion moves forward relative to said fixed front support means, said fixed rear support means, and the rear frame portion when the mobile mining machine is in the gripping configuration and the thrust means

thrusts forward, and said fixed front support means, said fixed rear support means and the rear frame portion move forward relative to the front frame portion when said mobile mining machine is in the re-gripping configuration and the thrust means retracts from forward thrusting.

14. The mobile mining machine of claim 13, wherein further extension of said front lift cylinder means and said rear lift cylinder means configures said mobile mining machine in a tramming configuration in which said front support pad means and said rear support pad means are raised from the tunnel floor.

15. The holding apparatus of claim 12, further comprising:

guide column means slidably mounted in a guide column channel in said front frame portion for sliding movement of said fixed front support means and the front frame portion with respect to each other; and

support trunnion means mounted in a cavity of the front frame portion and fixedly attached to said guide column means, said support trunnion being connected to said front gripper cylinder means and being sized smaller than the cavity for sliding movement of said

support trunnion means in the cavity upon sliding movement of said fixed front support means and the front frame portion with respect to each other.

16. A muck apron assembly for a mobile mining machine comprising:

a substantially planar center section;

a hopper on said center section having a conveyor feed opening adapted to communicate with muck conveyor means;

substantially planar wing sections pivotally attached to ends of said center section;

wing section swing cylinder means for pivotal movement of said wing sections between a substantially planar orientation with said center section and a substantially perpendicular orientation to said center section; and

muck apron lift cylinder means connecting for lift-up and lowering said muck apron asembly relative to the mobile mining machine.

17. A cutterhead positioning assembly for a mobile mining machine having a cutterhead and a frame, said cutterhead positioning assembly comprising:

pitch boom assembly means supporting said cutterhead and causing vertical movement of said cutterhead; and

swing boom assembly means supported by the frame, said swing boom assembly supporting said pitch boom assembly means and causing horizontal movement of said cutterhead and said pitch boom assembly means.

18. The cutterhead positioning assembly of claim 17, wherein said pitch boom assembly means includes four pitch boom cylinders attached to the pitch boom assembly means and to said swing boom assembly means.

19. The cutterhead positioning assembly of claim 17, wherein said swing boom assembly includes two swing boom cylinders attached to said swing boom assembly means and to the frame of the mobile mining machine.

20. A mobile mining machine for cutting a tunnel in rock substantially as herein described with reference to and as illustrated in any one of figures 1 to 11.

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